CX – 15

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E. Bldg 1
Seattle, WA 98115

Refer to NMFS No:
NWR/2013/10295

July 16, 2013

Rick Brazell, Forest Supervisor
Nez Perce-Clearwater National Forest
104 Airport Road
Grangeville, Idaho 83530

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Lolo Creek Suction Dredging Program, HUCs 1706030616 and 1706030618, Idaho County, Idaho, (One Project).

Dear Mr. Brazell:

The enclosed document contains a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the Lolo Creek Suction Dredging Program proposed by the Nez Perce-Clearwater National Forest (NPCNF). In this Opinion, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of Snake River Basin steelhead or result in the destruction or adverse modification of designated critical habitat for Snake River Basin steelhead.

As required by section 7 of the ESA, NMFS provides an incidental take statement with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal agency and any person who performs the action must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA take prohibition.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. These conservation recommendations are not identical to the ESA terms and conditions. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

If the response is inconsistent with the EFH conservation recommendations, the NPCNF must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

If you have questions regarding this consultation, please contact Shawna Theisen, (208) 983-4062, North Idaho Branch Office or David Arthaud, (208) 378-5694, Idaho State Habitat Office.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

Enclosure

cc: R. Hennekey – IDFG
D. Kenney – NPCNF
J. Foss – USFWS
M. Lopez – NPT

bcc: ISHO – File copy, Read File, Biological Opinion File, D. Arthaud (electronic copy)
NIBO – S. Theisen (electronic copy)

Arthaud:Mabe: Lolo Creek Suction Dredging Program:jl:07/12/13:F/NWR/2013/10295]

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Endangered Species Act Section 7(a)(2) Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation

Lolo Creek Suction Dredging Program
HUCs 1706030616 and 1706030618, Idaho County, Idaho

NMFS Consultation Number: NWR-2013-10295

Action Agency: U.S. Department of Agriculture, Nez Perce-Clearwater National Forest

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Snake River Basin steelhead (*Oncorhynchus mykiss*)	Threatened	Yes	No	No

Fishery Management Plan Describing EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Issued By:

for William W. Stelle, Jr.
Regional Administrator

Date: July 16, 2013

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ACRONYMS

BA	Biological Assessment
CNF	Clearwater National Forest
DPS	Distinct Population Segment
DQA	Data Quality Act
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
ft^2	square feet
IDEQ	Idaho Department of Environmental Quality
IDWR	Idaho Department of Water Resources
ISAB	Independent Scientific Advisory Board
ITS	Incidental Take Statement
LGD	Lower Granite Dam
m^2	square meter
MPG	Major Population Groups
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NPCNF	Nez Perce-Clearwater National Forest
Opinion	Biological Opinion
PCE	Primary Constituent Elements
PFMC	Pacific Fishery Management Council
RPA	Reasonable and Prudent Alternative
RPM	Reasonable and Prudent Measure
SRB	Snake River Basin
NPT	Nez Perce Tribe
USFWS	U. S. Fish and Wildlife Service
VSP	Viable Salmonid Population

1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1. Background

The biological opinion (Opinion) and incidental take statement (ITS) portions of this consultation were prepared by the National Marine Fisheries Service (NMFS) in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, et seq.), and implementing regulations at 50 CFR 402. With respect to designated critical habitat, the following analysis relied only on the statutory provisions of the ESA, and not on the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02.

NMFS also completed an essential fish habitat (EFH) consultation. It was prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA;16 U.S.C. 1801, et seq.) and implementing regulations at 50 CFR 600.

The Opinion and EFH conservation recommendations are both in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-5444; Data Quality Act) and underwent pre-dissemination review.

1.2. Consultation History

The Nez Perce-Clearwater Forest (NPCNF) proposes to allow recreational suction dredging over the next 11 years (2013 to 2023) in Lolo Creek, a major tributary of the lower Clearwater River in Idaho. The proposed suction dredging location and activities are similar to those most recently permitted by NMFS in 2009 and 2010. Prompted by the listings of Snake River Basin (SRB) steelhead and bull trout under the ESA and the potential for resource damage of the activity, consultation activity on suction dredge mining in Lolo Creek has occurred most years since 1998. A detailed history and description of this permitting process is described in Appendix A of the NPCNF's biological assessment for this project.

Past consultations on Lolo Creek recreational dredging resulted in an extensive consultation history and an accumulation of safeguards and monitoring measures as described in the proposed action section of this document. In the past, the then Clearwater National Forest (CNF) worked cooperatively with dredge miners to select specific locations and operating procedures that allowed dredge miners to operate with minimal disturbance to fish and fish habitat.

Field reviews of mining activities in Lolo Creek were attended by dredge miners, the CNF, U.S. Fish and Wildlife Service (USFWS), NMFS, Nez Perce Tribe (NPT), and Idaho Department of Water Resources (IDWR) prior to dredging and after dredging. Field reviews covered operations and measures to prevent or reduce potential unwanted effects and evaluated the effects of recreational mining to determine if any changes were needed in operating procedures to avoid unwanted future effects. In the last completed consultation NMFS evaluated the CNF project proposal described in the 2008 BA for recreational suction dredging during the 2009 and 2010 dredging seasons.

In the present consultation NMFS received a BA from the NPCNF requesting consultation on April 15, 2013. During June, NMFS and the NPCNF discussed the possibility of a programmatic consultation for the activity. Additionally, technical issues regarding dredge spacing and quantifying area disturbed by dredging were discussed. On June 21, 2013, the NPCNF amended the BA to fit a potential 11-year program. A copy of the draft Opinion was electronically mailed to the NPCNF for review and comments on July 10, 2013.

The Lolo Creek Suction Dredging Program activities will likely affect tribal trust resources. NMFS contacted the NPT pursuant to the Secretarial Order during several of the past consultations to discuss the potential effects of suction dredging. In these previous communications, the NPT expressed opposition to dredging in Lolo Creek due to potential conflicts with their ongoing efforts to re-establish, through hatchery supplementation, fishable populations of steelhead, Chinook salmon, and coho salmon in Lolo Creek. The NPT also stated concerns that if mining were to be conducted, monitoring should be sufficiently rigorous to accurately assess incidental take, to determine if miners complied with protective measures, and to determine if the protective measures were adequate. Draft sections of the Opinion were electronically mailed to the NPT (M. Lopez) for review and comments on June 14, 2013. No response was received.

1.3. Proposed Action

1.3.1. Description of the Proposed Action

The NPCNF proposes a program to grant up to 18 special use permits each year for recreational suction dredge mining in Lolo Creek over the next 11 years (2013 to 2023). The NPCNF would manage and monitor seasonal use and impacts as outlined below and in the BA. The program limits cumulative dredging disturbance of stream substrate to 72,000 square feet (ft^2). Additionally, the total area dredged within any season would not exceed 36,000 ft^2 and no individual sectional operation would exceed 3,000 ft^2 of dredged area within any season.

Based upon recently processed permits, the 2013 recreational suction dredging season would allow operations in two sections of Lolo Creek. These sections were delineated, including cross sectional and longitudinal elevation profiles, and photographed. The upstream dredging section is

in Section 10 of T6E, R35N near the confluence of Dutchman Creek and is about 250 feet in length. The upper part of the section includes numerous large boulders and the remainder is predominantly cobble substrate. No areas were excluded based on mitigation measures. The downstream dredging section is in Section 7 of T6E, R34N near the confluence of Brady Creek and is about 150 feet long. The entire section is primarily sand-embedded cobble and no areas were excluded based on mitigation measures.

After 2013, mining claim/operation names and locations will not be known until applications are completed and dredging sections delineated immediately prior to each season. The number of days of dredging and likely length, area, and volume of dredged areas are therefore also currently unknown. However, no individual section operation will be allowed to exceed 3,000 ft^2 of dredged area within any season and the total area dredged within any season will not exceed 36,000 ft^2.

During 2013 and future seasons, mining will occur during the low-water work window of July 15 to August 15. Proposed activities consist of operating suction dredges with nozzles ranging from 2.5 to 5 inches in diameter, and engines with 15 horsepower or less. Individual dredges will operate in sections ranging in size from 24 to 3,000 ft^2. These mining sections are delineated prior to each season and are intentionally located in areas that are deemed by NPCNF biologists to be poorly suited for steelhead spawning or juvenile rearing.

Suction dredges will be allowed to excavate streambed materials down to bedrock, where heavier gold particles may be deposited. Excavated materials are sucked into the dredge nozzle, passed through a sluice box attached to the back of the dredge, and then deposited in the stream. A suction dredge motor is generally operated for a short duration on a given day because the technique requires miners to sort through the materials that pass through the dredge, which is time consuming. Holes or piles are required to be filled after dredging.

Monitoring during the 2001 season, showed dredge sites were typically located in areas where the depth to bedrock was relatively shallow (usually less than 6 feet), minimizing the amount of material that needed to be excavated before reaching gold-bearing deposits. Monitoring during the 1998 and 2009 dredge seasons found that on average suction dredges were operated 3 to 5 hours per day 4 days per week and most dredging within sections was less than 2,000 ft^2. From this information 3,000 ft^2 was set as a maximum impact for individual mining sections. If all 18 operations that could be permitted were allowed to disturb 2,000 ft^2 each, that area would be 36,000 ft^2, which was set as the seasonal maximum. Twice the maximum season disturbance was set as the cumulative total impact for the program (Table 1).

Table 1. Proposed 2013 to 2023 suction dredging by total stream lengths and area.

Stream	Linear stream distance in feet (miles)	Project stream area (ft^2)	Maximum area proposed for dredging (ft^2)	Maximum proportion proposed for dredging
Lolo Creek (mainstem w/in project area)	63,304 (12.0)	2,371,368	n/a	n/a
Dutchman Creek (w/in project area)	8,364 (1.6)	30,280	n/a	n/a
Total	71,688 (13.6)	2,401,648	72,000	3.0%

In past years, proposed dredging sites were primarily located outside potential spawning areas and in areas of larger substrate materials (large cobbles to boulder substrates). Areas surrounding boulders have been dredged and the boulders moved slightly, but the function of the boulders of providing rearing habitat was maintained. The NPCNF tries to delineate 100-foot or more lengths of stream for mining, but typically allows miners to move across the channel within the section where specific areas are suitable and will not change stream channel morphology or substrate size. After this habitat delineation by NPCNF biologists, but prior to the mining season, a field review would be conducted by the Level 1 consultation team members to ensure that the areas proposed by the operators and NPCNF for suction dredging within the operation sites is delineated in a manner that will have minimum effects to listed species (steelhead and bull trout) and EFH-relevant species (Chinook and coho salmon).

Included in the proposed action are the use of riparian areas proximate to lower Dutchman and Lolo Creeks where activities (i.e., camping, vehicle and equipment access) associated with mining may occur.

Each season before the NPCNF authorizes a miner to operate a suction dredge, each claimant or miner will submit to the NPCNF a proposed operating plan that includes all 32 of the precautionary measures described below. The proposed plan will provide site-specific information sufficient for the NPCNF to determine that the terms and conditions will be adequate for protection of surface resources on that specific site. The NPCNF will also conduct a pre-season field review of the proposed mining sites to ensure the sites are located where minimal effects to listed species will occur.

1.3.2. Precautionary Measures

The NPCNF requires miners to comply with the following precautionary measures to minimize or avoid effects to Snake River steelhead:

1. Operations will occur only within the wetted perimeter below the ordinary high water line during a dredge season extending from July 15 through August 15.
2. Before dredge mining begins, operators must submit an operating plan to the NPCNF that includes all of the operating conditions, design features, and mitigation measures, and specifies the location, approximate amount of surface area they plan to dredge, and likely dates of operation. The operating plan will be used to establish channel-monitoring sites, and is not intended to constrain the timing and location of dredge operations.
3. Prior to dredging, operators must meet with a NPCNF fisheries biologist who will inspect the proposed dredge sites. No dredging will be allowed in areas of known steelhead spawning or in areas identified as spawning habitat. The areas that would be required to be avoided would generally be specific locations within the proposed dredging areas rather than extensive stream reaches.
4. The suction dredge will have a nozzle diameter of 5 inches or less and a horsepower rating of 15 horsepower or less.
5. Pump intakes must be covered with 3/32-mesh screen or finer.
6. Dredge sites must be located in areas of large substrate not preferred for spawning steelhead and operators may only dredge 50 feet or more from identified spawning areas.
7. Dredging operations must take place during daylight hours.
8. Dredging must be conducted in a manner so as to prevent the undercutting and destabilization of streambanks, and may not otherwise disturb streambanks.
9. If streambanks are disturbed in any way, they must be restored to the original contour and re-vegetated with native species at the end of the dredging season.
10. Camping areas, paths, and other disturbed sites that are located along streambanks and that are associated with dredge operations must be re-vegetated or otherwise restored to their original conditions at the end of the dredge season.
11. Operators must cease activities during wet periods when project activities are causing excessive ground disturbance (visible ground disturbance due to soil saturation) or excessive damage (muddying/rutting) to roads.
12. Dredges must not operate in such a way that the current or the discharge from the sluice is directed into the bank in a way that causes erosion or destruction of the natural form of the channel, that undercuts the bank, or that widens the channel.

13. Operators must not undermine, excavate, or remove any stable woody debris or boulders that extend from the bank into the channel. This will prevent destabilization of streambanks and the stream channel.

14. Operators must not remove, relocate, or disturb stable in-stream woody debris or boulders greater than 12 inches in diameter, unless it was determined during the pre-mining site review that the predominate substrate was 12 inches and retaining larger boulders would be more beneficial to that particular reach. This design feature will prevent the destabilization of the stream channel and assure that potential fish habitat would not be disturbed.

15. The operator will not remove any large down or standing woody debris or trees for firewood within one tree length of the stream.

16. Operators will not move cobbles in the stream course to the extent that the deepest and fastest portion of the stream channel (i.e., the thalweg) is altered or moved.

17. No mechanized equipment will be operated below the mean high water mark except for the dredge itself and any life support system necessary to operate the dredge. No mechanized equipment other than the suction dredge will be used for conducting operations.

18. Dredging must not dam the stream channel.

19. Dredges must not operate in the gravel bar areas at the tails of pools.

20. Dredges must not operate in such a way that fine sediment from the dredge discharge blankets gravel bars.

21. Operators must visually monitor the stream for 150 feet downstream of the dredging operation. If noticeable turbidity is observed downstream, the operation must cease immediately or decrease in intensity until no increase in turbidity is observed 150 feet downstream.

22. Shallow areas must be restored to their original grade each day and natural pools may not be filled. Tailings must be redistributed to avoid creating unstable spawning gravels.

23. All dredge piles must be dispersed and all dredge holes backfilled before moving to a new dredge location and by the end of the operating season.

24. Dredging operations must shut down immediately if any sick, injured, or dead specimen of a threatened or endangered species is found. The finder must take care in handling sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition. The finder must also ensure that evidence intrinsic to the specimen is not disturbed unnecessarily. In addition, if any fish eggs are excavated or if destruction of redds is observed, operators must contact the NPCNF and receive authorization to proceed prior to resuming operations. Operators must record the date, time, location, and possible cause of fish injury or death.

25. Operators must maintain a minimum spacing of at least 150 linear feet of stream channel between suction dredging operations.
26. Gasoline and other petroleum products must be stored in spill-proof containers at a location that minimizes the opportunity for accidental spillage.
27. The suction dredge must be checked for leaks, and all leaks repaired, prior to the start of operations each day. The fuel container used for refueling must contain less fuel than the amount needed to fill the tank. The suction dredge must be anchored to the streambank when refueling in the water, so that fuel does not need to be carried out into the stream. Unless the dredge has a detachable fuel tank, operators may transfer no more than 1 gallon of fuel at a time during refilling. Operators must use a funnel while pouring, and place an absorbent material such as a towel under the fuel tank to catch any spillage from refueling operations. A spill kit must be available in case of accidental spills. Soil contaminated by spilled petroleum products, must be excavated to the depth of saturation and removed for proper disposal.
28. Operators will not entrain, mobilize, or disperse any mercury discovered during mining operations. Operators must cease operations and notify the NPCNF if mercury is encountered in dredged material. Operators must not use mercury, cyanide, or any other hazardous or refined substance to recover or concentrate gold.
29. All human waste must be kept more than 200 feet away from any live water. All refuse from dredging activities must be packed out and disposed of properly.
30. Operators must obtain all appropriate Idaho and Federal permits and comply with conditions or measures stipulated in those permits, including best management practices.
31. Surveys identified various heritage resource sites in the area. If additional heritage resources are found, mining activities are to cease. The NPCNF archaeologist will be notified, and an assessment will be made regarding the effect of continued activities on the newly identified heritage resource.
32. To prevent the threat of aquatic invasive species, suction dredges, tools used while dredging, and associated equipment must be thoroughly cleaned with a pressure washer and dried at least 5 days prior to use.

1.3.3. Monitoring Requirements

Implementation monitoring will be conducted by NPCNF geologists or minerals administrators by field review monitoring of individual suction dredging operations throughout each mining season. Each mining operation will be monitored a minimum of 5 days, with the number of monitoring days for shorter operations proportional to their length. District personnel, hydrologists and fisheries biologists will also assist the geologist in implementation monitoring. The geologist will provide reports to the Level 1 team.

The NPCNF hydrologists and fisheries biologists, or their qualified designees, will conduct field reviews of each mining activity each season to assess the effectiveness of the permit provisions (including mitigation and conservation measures). Any additional recommendations for current and future years will be documented for the Level 1 consultation process. In particular the number and location of monitoring sites will be determined annually in discussion with NPCNF personnel and the Level 1 team. Digital photos will be taken at five to 10 representative points (flagged and with recorded global positioning system coordinates and direction) which will be established for approved mining operations depicting the stream and riparian conditions prior to and following mining operations. Photos should show the location and features such as large woody debris, boulders, and streambank condition. Representative digital photos will also be taken during actual mining at and directly downstream of the mining operations. Potential changes in channel morphology as a result of mining will be monitored by following activities at the mining site and in the pool/riffle sequences immediately upstream and downstream from the mined area before and after mining using: (1) Wolman pebble counts; (2) channel cross-sections; and (3) one longitudinal profile.

The NPCNF personnel will complete annual fish surveys by snorkeling at up to 15 specific sites in the mainstem Lolo Creek and lower Dutchman Creek in the project reach during July or August to assess steelhead presence/absence and relative density. The NPCNF fisheries biologist will also document these results and those of any other available surveys, weirs, and traps for the Level 1 consultation process.

The following monitoring measures will be completed and reported to NMFS by the NPCNF:

1. Prior to July 1 each year, an interagency field trip will be held to review mining sites with local miners to determine if any additional mitigation or terms and conditions will be needed to avoid impacts to listed species. In addition to Level 1 team members, representatives from the Idaho Department of Fish and Game, IDWR, and NPT may attend.

2. All proposed suction dredge plans of operations will be reviewed by the NPCNF prior to approving mining activities each season.

3. Each operator will sign a written statement listing and accepting all mitigation and terms and conditions as part of their operations plan prior to approval.

4. Each dredge site will be visited by NPCNF staff at least once per week or five times per season, to monitor dredge activity and effects of mining on fish and habitat.

5. In addition to NPCNF monitoring results, add end of season reports from operator surveys regarding dredging locations, surface area, and effort and compare with field data.

6. Monitor potential changes in channel morphology as a result of mining.

7. Reports or observations of dead or injured steelhead or evacuated eggs.

8. Provide by the end of each year an annual monitoring report that describes operator compliance with suction dredging rules; amount of stream area mined by site, season, and cumulative total; photos of mined areas; and details about riparian habitat or streambank disturbances and any restoration plans and activities.

1.4. Description of the Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for this recreational suction dredging proposal consists of the lower 1.6 miles of Dutchman Creek and the 9.5 mile reach of mainstem Lolo Creek from its confluence with Yoosa Creek downstream to Musselshell Creek. The action area encompasses all dredge mining sites and the downstream extent of stream reaches that might be affected by sediment or turbidity created by operations. Mining is not proposed on other tributaries along this reach of the Lolo Creek, although included in the action area are riparian areas proximate to lower Dutchman and Lolo Creeks where activities (i.e., camping, vehicle and equipment access) associated with mining may occur. Streams in the area serve as spawning, rearing, and migratory habitat for SRB steelhead and are designated critical habitat (see Table 2). Snake River spring/summer Chinook and coho salmon also use Lolo Creek, but are not listed under the ESA in the Clearwater drainage.

Table 2. Federal Register notices for final rules that list threatened and endangered species, designated critical habitat, or apply protective regulations to listed species considered in this consultation.

Species	Listing Status	Critical Habitat	Protective Regulations
Steelhead (*O. mykiss*)			
Snake River Basin	T 1/05/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Note: Listing status 'T' means listed as threatened under the ESA.

2. ENDANGERED SPECIES ACT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the USFWS, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Section 7(b)(3) requires that at the conclusion of consultation, NMFS provides an opinion stating how the agencies' actions will affect listed species or their critical habitat. If incidental take is expected, section 7(b)(4) requires the provision of an ITS specifying the impact of any incidental taking, and including reasonable and prudent measures (RPMs) to minimize such impacts.

2.1. Introduction to the Biological Opinion

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

This Opinion does not rely on the regulatory definition of 'destruction or adverse modification of critical habitat at 50 C.F.R. 402.02. Instead, NMFS has relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.[1]

NMFS uses the following approach to determine if the proposed action described in Section 1.3 is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- *Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action.* This section describes the current status of each listed species and its critical habitat relative to the conditions needed for recovery. For listed salmon and steelhead, NMFS has developed specific guidance for analyzing the status of the listed species' component populations in a "viable salmonid populations" (VSP) paper (McElhany *et al.* 2000). The VSP approach considers the abundance, productivity, spatial structure, and diversity of each population as part of the overall review of a species' status. For listed salmon and steelhead, the VSP criteria, therefore, encompass the species' "reproduction, numbers, or distribution" (50 CFR 402.02). In describing the range-wide status of listed species, NMFS relies on viability assessments and criteria in technical recovery team documents and recovery plans, where available, that describe how VSP criteria are applied to specific populations, major population groups (MPG), and species. NMFS determines the rangewide status of critical habitat by examining the condition of its physical or biological features (also called "primary constituent elements" or PCEs in some designations) - which were identified when the critical habitat was designated. Species and critical habitat status are discussed in Section 2.2.

- *Describe the environmental baseline for the proposed action.* The environmental baseline includes the past and present impacts of Federal, state, or private actions and other human activities *in the action area.* It includes the anticipated impacts of proposed Federal

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1 Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act) (November 7, 2005).

projects that have already undergone formal or early section 7 consultation and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline is discussed in Section 2.3 of this Opinion.

- *Analyze the effects of the proposed actions.* In this step, NMFS considers how the proposed action would affect the species' reproduction, numbers, and distribution or, in the case of salmon and steelhead, their VSP characteristics. NMFS also evaluates the proposed action's effects on critical habitat features. The effects of the action are described in Section 2.4 of this Opinion.

- *Describe any cumulative effects.* Cumulative effects, as defined in NMFS' implementing regulations (50 CFR 402.02), are the effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area. Future Federal actions that are unrelated to the proposed action are not considered because they require separate section 7 consultation. Cumulative effects are considered in Section 2.5 of this Opinion.

- *Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat.* In this step, NMFS adds the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to assess if the action could reasonably be expected to: (1) Appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2). Integration and synthesis occurs in Section 2.6 of this Opinion.

- *Reach jeopardy and adverse modification conclusions.* Conclusions regarding jeopardy and the destruction or adverse modification of critical habitat are presented in Section 2.7. These conclusions flow from the logic and rationale presented in the Integration and Synthesis Section (2.6).

- *If necessary, define a reasonable and prudent alternative to the proposed action.* If, in completing the last step in the analysis, NMFS determines that the action under consultation is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat, NMFS must identify a reasonable and prudent alternative (RPA) to the action in Section 2.8. The RPA must not be likely to jeopardize the continued existence of ESA-listed species nor adversely modify their designated critical habitat and it must meet other regulatory requirements.

2.2. Rangewide Status of the Species and Critical Habitat

This section defines the biological requirements of each listed species affected by the proposed action, and the status of each designated critical habitat relative to those species requirements. Listed species facing a high risk of extinction and critical habitats with degraded conservation value are more vulnerable to the aggregation of effects considered under the environmental baseline, the effects of the proposed action, and cumulative effects.

2.2.1. Status of the Species

NMFS reviews the condition of the listed species affected by the proposed action using criteria that describe a VSP (McElhany *et al.* 2000). Attributes associated with a VSP include abundance, productivity, spatial structure, and genetic diversity that maintain its capacity to adapt to various environmental conditions and allow it to sustain itself in the natural environment. These attributes are influenced by survival, behavior, and experiences throughout the entire life cycle, characteristics that are influenced, in turn, by habitat and other environmental conditions.

2.2.1.1. Status of the SRB Steelhead Distinct Population Segment (DPS)

The SRB steelhead were listed as threatened on August 18, 1997 (62 FR 43937). The listing was revised on January 5, 2006 (71 FR 834), after a review of the relationship of natural-origin steelhead with hatchery fish and resident *O. mykiss*. The revised SRB steelhead DPS includes all natural-origin populations of steelhead in the SRB of southeast Washington, northeast Oregon, and Idaho (Figure 1). It also includes six hatchery stocks, including fish from the Dworshak National Fish Hatchery and the rearing facilities in Lolo Creek. Critical habitat for SRB steelhead was designated on September 2, 2005 (70 FR 52630).

The Snake River historically supported more than 55% of total natural-origin production of steelhead in the Columbia River Basin. It now has approximately 63% of the basin's natural production potential. The SRB steelhead DPS is distributed throughout the Snake River drainage system, including tributaries in southwest Washington, eastern Oregon, and north-central Idaho (Good *et al.* 2005). The SRB steelhead migrate a substantial distance from the ocean (up to 940 miles) and use high elevation tributaries (up to 6,600 feet above sea level) for spawning and juvenile rearing. The SRB steelhead occupy habitat that is considerably warmer and drier (on an annual basis) than other steelhead DPSs. The SRB steelhead are generally classified as summer run, based on their adult run timing pattern. Summer steelhead enter the Columbia River from late June to October. After holding over the winter, summer steelhead spawn during the following spring (March to June). Managers classify up-river summer steelhead runs into two groups based primarily on ocean age and adult size upon return to the Columbia River. A-run steelhead are predominately age-1-ocean fish while B-run steelhead are larger, predominately age-2-ocean fish. A-runs occur throughout the SRB and remaining B-runs are thought to be produced only in the Clearwater and Salmon Rivers.

Information on the range-wide status of SRB steelhead is described in the 2005 steelhead status review (Busby *et al.* 1996), the status review update (BRT 2003), the DPS listing (January 5, 2006, 71 FR 834), the U.S. v. Oregon decision and its Supplemental Comprehensive Analysis (NMFS 2008), and the most recent status review update by Ford (2011).

With a few exceptions, more recent annual estimates of steelhead returns to specific production areas within the Snake River are not available. Annual return estimates are limited to counts of the aggregate returns over Lower Granite Dam (LGD). Returns to LGD remained at relatively low levels through the 1990s. The 2001 run size at LGD was substantially higher relative to the 1990s. The 2002 through 2004 return years declined annually but continued to remain higher than the 1990s return years. Although steelhead numbers have dramatically increased, natural-origin steelhead have comprised only 10% to 26% of the total returns since 1994. Consequently, the large increase in fish numbers does not reflect a change in steelhead status based on historic levels. The long-term trend for this species indicates a decline and the natural-origin abundance and productivity are still below their targets. The recent 5 year (2006 to 2010) mean abundance is 48,743 natural returns (FPC 2012). This is a slight increase over the previous 5 year (2001 to 2005) mean abundance level of 44,516 fish counted at LGD.

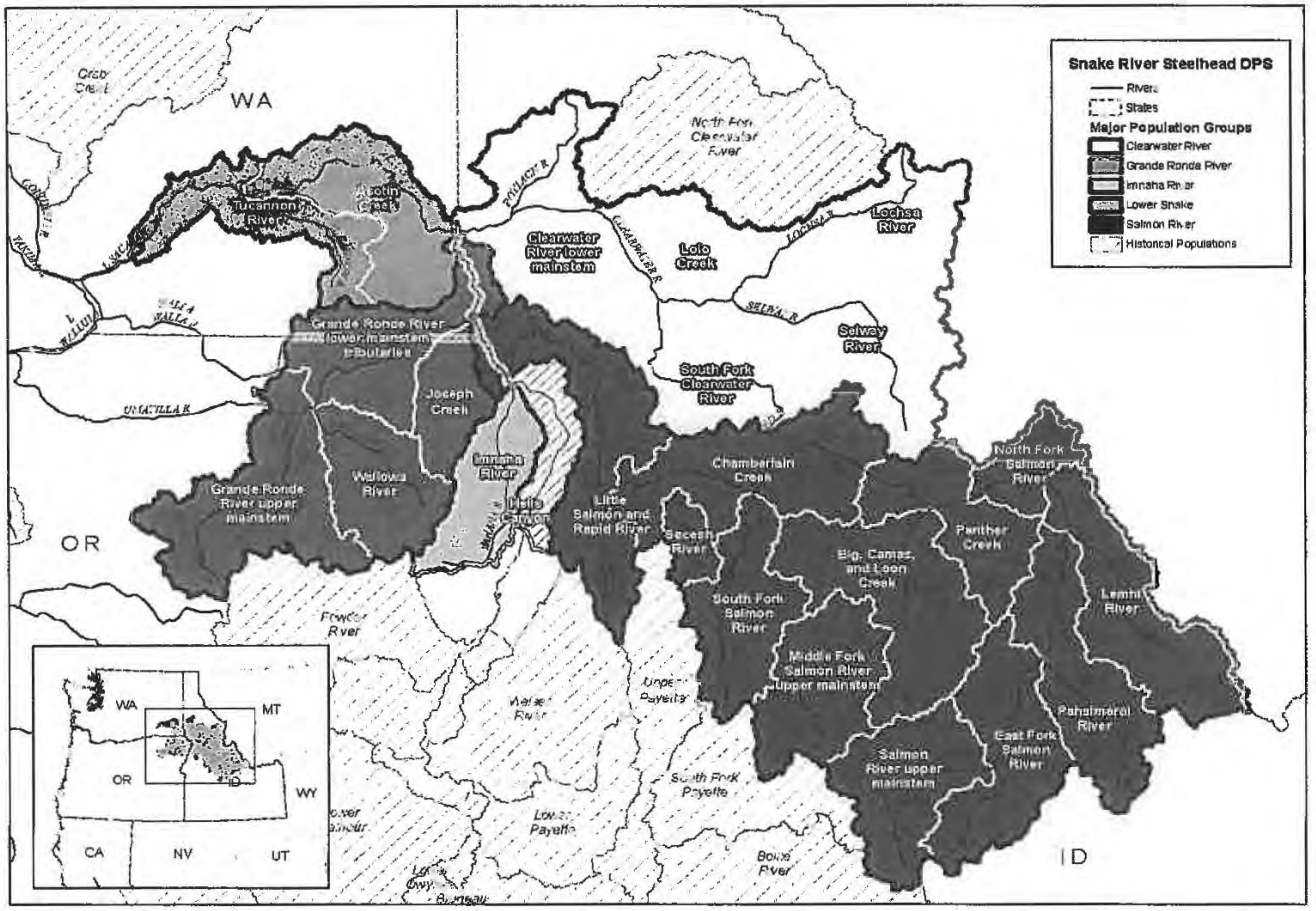

Figure 1. Map showing locations of MPGs and individual populations of Snake River steelhead

Despite a slight increase in the 2000s, natural runs of SRB steelhead have been declining in abundance over the past few decades. Significant factors in the declining populations include, but are not limited to, mortality associated with the many dams along the Columbia and Snake Rivers, losses from harvest, loss of access to more than 50% of their historic range, and degradation of habitat used for spawning and rearing. Possible genetic introgression from hatchery stocks is another threat to SRB steelhead since natural-origin fish comprise such a small proportion of the population. Additional information on the biology, status, and habitat elements for SRB steelhead are described in Busby *et al.* (1996).

The Columbia Basin Technical Recovery Team (ICTRT 2003) has identified six MPGs in this DPS for the SRB steelhead: (1) Clearwater River; (2) Grande Ronde River; (3) Hells Canyon; (4) Imnaha River; (5) lower Snake River; and (6) Salmon River. The SRB steelhead occupy habitat that is considerably warmer and drier (on an annual basis) than other steelhead DPSs.

Historically, steelhead populations in most of the Clearwater River drainage were adversely affected by a partial barrier dam that existed in the mainstem Clearwater River at Lewiston, Idaho, from 1927 to 1973 (Cramer *et al.* 1998). Another dam existed in the South Fork Clearwater River, near Harpster, Idaho, which was a complete barrier to migratory fish from 1910 to 1935 (Cramer *et al.* 1998). The effects of present-day dams in the Snake and Columbia Rivers, historic effects of the Harpster and Lewiston dams, and numerous habitat alterations likely have lingering effects on genetic characteristics, spatial structure, and productivity of steelhead in the Clearwater River MPG, as well as the for the entire DPS. The status of the Clearwater River MPG is unknown due to insufficient data, but it likely does not currently meet the MPG-level recovery goals due to low abundance and productivity of natural-origin steelhead (Ford 2011). The Clearwater River MPG contains five extant populations and one extirpated population. NMFS believes the integrated diversity/spatial structure and abundance/productivity risk for the Lolo Creek population to be moderate.

2.2.2. Status of Critical Habitat

NMFS reviews the status of designated critical habitat affected by the action by examining the condition and trends of PCEs throughout the designated area. The PCEs consist of the physical and biological features identified as essential to the conservation of the ESA-listed species in the documents that designate critical habitat (Table 3).

Snake River salmon and steelhead have experienced long-term declines in population size since the 1870s, and the present population sizes remain low in comparison to historical estimates. However, salmon and steelhead populations have been on a general increase since about 2000. Steep population declines occurred with construction of hydropower dams in the Snake River. In addition to effects of dams, population declines are attributed to the combined effects of activities that include harvest, hatchery fish, habitat loss and alterations, predator effects, and climatic conditions. Habitat loss from impassable hydropower dams, and streams dried in whole or in part by water withdrawals, sediment, and artificial passage barriers account for most of the losses of

freshwater habitat for Snake River salmon and steelhead (Lee *et al.* 1997). Effects of forestry, mining, roads, urbanization, and agriculture have reduced the quality of much of the remaining salmon and steelhead habitat outside roadless areas (Lee *et al.* 1997; McIntosh *et al.* 1994).

Hydropower dams associated with the Federal Columbia River Power System (FCRPS) have eliminated access to roughly 600 miles of streams historically accessible to salmon and steelhead. The FCRPS storage dams have eliminated mainstem rearing habitat and have altered the natural flow regime of the Snake and Columbia Rivers, decreased spring and summer flows, increased fall and winter flows, and altered natural thermal patterns. The eight Snake and Columbia River dams kill or injure a portion of the smolts passing through the migration corridor area, and the dams create artificial conditions favorable to salmon and steelhead predators, such as terns, sea lions, seals, and northern pikeminnow. The low velocity movement of water through the reservoirs behind the dams slows the smolts' journey to the ocean and enhances the survival of predatory fish (Independent Scientific Group 1996; NRC 1996). Changes in the operation and modifications to the FCRPS dams in the last decade have reduced adverse effects of the dams; however, the dams continue to kill or harm a sizable number of steelhead smolts. In-river mortality through the FCRPS, estimated by Williams *et al.* (2005) from 1997 to 2003, ranged from 28% to 58% for Snake River spring/summer Chinook and 4% to 50% for SRB steelhead.

Table 3. Types of sites and essential physical and biological features designated as PCEs, and the species life stage each PCE supports.

Site	Essential Physical and Biological Features	ESA-listed Species Life Stage
Snake River Basin Steelhead[a]		
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity & floodplain connectivity to form and maintain physical habitat conditions	Juvenile growth and mobility
	Water quality and forage[b]	Juvenile development
	Natural cover[c]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, forage, and natural cover[c]	Juvenile and adult mobility and survival

a. Additional PCEs pertaining to estuarine, nearshore, and offshore marine areas have also been described for SRB steelhead. These PCEs will not be affected by the proposed action and have therefore not been described in this Opinion.
b. Forage includes aquatic invertebrate and fish species that support growth and maturation.
c. Natural cover includes shade, large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

In many Columbia River watersheds, land management and development activities have: (1) Reduced connectivity (i.e., the flow of energy, organisms, and materials) between streams, riparian areas, floodplains, and uplands; (2) elevated fine sediment yields, degrading spawning and rearing habitat; (3) reduced large woody material that traps sediment, stabilizes streambanks, and helps form pools; (4) reduced vegetative canopy that minimizes solar heating of streams; (5) caused streams to become straighter, wider, and shallower, thereby reducing rearing habitat and increasing water temperature fluctuations; (6) altered peak flow volume and timing, leading to channel changes and potentially altering fish migration behavior; and (7) altered floodplain function, water tables and base flows[2] (Henjum *et al.* 1994; McIntosh *et al.* 1994; Rhodes *et al.* 1994; Wissmar *et al.* 1994; NRC 1996; Spence *et al.* 1996; and Lee *et al.* 1997; Ecovista *et al.* 2003). Ecovista *et al.* (2003) found all seven of these problems in the Middle Fork, South Fork, and mainstems of the Clearwater River drainage.

Climate change is likely to have negative implications for the conservation value of designated critical habitats in the Pacific Northwest (CIG 2004; Scheuerell and Williams 2005; Zabel *et al.* 2006; Independent Scientific Advisory Board [ISAB] 2007). Average annual northwest air temperatures have increased by approximately 1°C since 1900, or about 50% more than the global average warming over the same period (ISAB 2007). The latest climate models project a warming of 0.1 °C to 0.6 °C per decade over the next century. According to the ISAB, these effects may have the following physical impacts within the next 40 or so years:

- Warmer air temperatures will result in a shift to more winter/spring rain and runoff, rather than snow that is stored until the spring/summer melt season.
- With a shift to more rain and less snow, the snowpacks will diminish in those areas that typically accumulate and store water until the spring freshet.
- With a smaller snowpack, these watersheds will see their runoff diminished and exhausted earlier in the season, resulting in lower streamflows in the June through September period.
- River flows in general and peak river flows are likely to increase during the winter due to more precipitation falling as rain rather than snow.
- Water temperatures will continue to rise, especially during the summer months when lower streamflow and warmer air temperatures will contribute to the warming regional waters.

These changes will vary across the landscape. Areas at elevations high enough to maintain temperatures well below freezing for most of the winter and early spring would be less affected. Low-lying areas that historically have received scant precipitation contribute little to total streamflow and are likely to be more affected. These long-term effects may include, but are

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[2] Base flow is stream discharge sustained primarily by groundwater.

not limited to, depletion of cold water habitat, variation in quality and quantity of tributary rearing habitat, alterations to migration patterns, accelerated embryo development, premature emergence of fry, and increased competition among species.

2.3. Environmental Baseline

The 'environmental baseline' includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). An environmental baseline that does not meet the biological requirements of an ESA-listed species may increase the likelihood that adverse effects of the proposed action will result in jeopardy to a listed species or in destruction or adverse modification of a designated critical habitat.

NMFS describes the environmental baseline in terms of the biological requirements for habitat features and processes necessary to support all life stages of each ESA-listed species within the action area. The SRB steelhead considered in this Opinion reside in or migrate through the action area. Thus, for this action area the biological requirements are habitat characteristics that support successful completion of spawning, rearing, and migration.

The Lolo Creek drainage is predominantly forested mountains, with approximately 18 miles of mainstem Lolo Creek located within the NPCNF, and the remaining 24 miles having a mixed ownership of private, state, NPCNF, and Bureau of Land Management interests. Habitat conditions in the drainage have been altered by farming, mining, livestock grazing, timber harvest, and road building. Major limiting factors include extreme flow variation, high summer water temperatures, degraded riparian habitat, high sediment loads, channel impingement, and low densities of instream structure (Espinosa 1975; Johnson 1984; Bowersox and Brindza 2006; Bowersox and Biggs 2012). The NPCNF has allowed timber harvest ranging from 15 to 30 million board feet per year (Espinosa 1984; Espinosa and Lee 1991). Associated road densities average over 5 miles per square mile and exceed 14 miles per square mile in some areas (Wilmer 2011), blocking fish access to headwater areas and creating many passage impediments. Roads are located in riparian areas and floodplains throughout the drainage, increasing stream sediment delivery and water temperature, altering streambank and floodplain conditions, and reducing large woody debris recruitment and instream cover. In addition, channel instability from channelization caused by road development decreases quantity and quality of spawning and rearing habitats. The NPCNF surveys, as described in the BA for this proposed action, indicate that a number of streams within the Lolo Creek drainage can be characterized by fair-poor substrate conditions, fair-good riparian conditions, and fair rearing habitats. The primary limiting factor for salmonid production within the lower mainstem Lolo Creek is the high summer water temperatures, with monitoring data showing water temperatures well above optimum for salmonid production.

In the BA, the NPCNF states that the Lolo Creek steelhead population is a combination of natural and hatchery-influenced fish which produces very few steelhead due to poor adult returns and degraded habitat conditions from historic stream channel alterations. Steelhead spawning occurs in the mainstem of Lolo Creek, from Musselshell Creek to Yoosa Creek, and also in tributaries in the upper Lolo Creek and Yoosa Creek drainages. Limited spawning may also occur in the Musselshell Creek and Eldorado Creek drainages, based on observations of juvenile steelhead in those areas. Juvenile steelhead rearing and spawning have also been documented in the upper mainstem of Lolo Creek, although the number of redds observed has been relatively low. Clearwater BioStudies, Inc. (1988) reported 88 steelhead redds in Lolo Creek during their July 1988 stream survey. The report noted that most redds (57) were found upstream of Musselshell Creek and downstream of Yoosa Creek, which roughly coincides with the action area. Most redds were associated with log drop structures or side channels installed by the NPCNF as habitat enhancement. Of the 57 identified redds, 44 were reported above White Creek Bridge and Yoosa Creek and 13 were reported between White Creek Bridge and Musselshell Creek. Lolo Creek, in the action area, is a low gradient stream segment that generally does not provide suitable spawning habitat for anadromous salmonids.

Juvenile steelhead snorkel data indicate that fish were observed 94% of the time at 551 snorkel stations from 1985 to 2003 (NPCNF BA). Average densities of juvenile steelhead documented by the NPCNF between 1988 and 1995 ranged between 0.8 and 6.7 fish/100 square meter ($m^{2)}$ (~120 square yards or yd^2). In the years 1996 and 1998, Clearwater BioStudies reported very low densities of 0.33 and 0.51 fish/100 m^2. Steelhead densities reported in 2000 through 2004 varied between 0.3 and 2.1 fish/100 m^2. In 2004, population densities of 1+ juveniles were observed to be 0.4 fish/100 m^2. Over the last 10-year period, juvenile production has been very low.

In 1998, fish habitat within 23 Lolo Creek reaches surveyed was generally similar to conditions documented during a 1993 survey. Slight changes in overall substrate conditions were observed in individual reaches. The average cobble embeddedness levels measured during the 1993 and 1998 surveys increased slightly from 44% to 46%. A 1988 survey (Clearwater BioStudies, Inc. 1988) measured cobble embeddedness as 51.4%. The stream substrate conditions do not meet the NPCNF Plan standard of 30% to 35% for B and C channel types. Other changes in stream conditions between 1993 and 1998 were slight decreases in woody debris levels and streambank stability ratings. Moderate increases in pool habitat (quantity and quality) were observed. In addition, salmonids prefer cold water and temperatures above 77°F are lethal to most species (Spence *et al.* 1996). The optimal egg development temperature is 45°F, and the desired rearing temperature is around 62°F. Summer Lolo Creek temperatures in the action area range from 66°F during a cool summer to 79°F during a hot summer.

Over the past few years, water quality of Lolo Creek and its tributaries has been listed under the Clean Water Act as impaired for bacteria, nutrients, sediment, temperature, and habitat and flow alteration (IDEQ 1998, 2005, 2011a). A 2011 Total Maximum Daily Load called for more shade to reduce temperature in Jim Brown, Eldorado, and Musselshell Creeks and proposed delisting all other impairments, except physical substrate and flow alterations (IDEQ 2011b, 2013).

2.4. Effects of the Action on the Species and Designated Critical Habitat

2.4.1. Effects on Listed Species

This section describes the effects of the proposed recreational dredging activities on individual fish and evaluates the consequences of those effects on the viability of steelhead at the Lolo Creek population and DPS scales. The proposed action is likely to affect any steelhead that are developing in redds and juvenile fish that are rearing in the area after emergence. Adult steelhead likely will not be present in the action area when mining occurs and should not be affected. The timing of mining activities during summer low flows limits exposure of steelhead alevins that will likely have already emerged from redds. During mining activities juvenile steelhead from 0 to 4 years of age are likely to migrate through and rear in the area, using spaces underneath banks and substrate for cover and shade.

The proposed action is reasonably certain to affect individual steelhead and critical habitat by increasing turbidity and risk of petroleum contamination and by altering physical channel characteristics through sediment deposition, stream bottom alteration, and riparian disturbance. The action also has the potential to harm, harass, or kill juvenile fish by sucking fish through dredges or against screens, crushing fish hiding in substrates, adding fuels to water, and creating stream disturbances that affect primary feeding times and locations of juveniles. These adverse effects are minimized or avoided under the proposed action through mitigation and precautionary measures imposed on the miners by the NPCNF (see proposed action) and the IDWR. Required mitigation includes provisions that limit: duration of dredging activity per day and cumulatively by season; areal size and spacing of disturbance; locations to reduce or eliminate exposure of redds to sediment, crushing or excavation; and timing of activities to avoid critical egg and alevin incubation periods.

Published studies on dredge mining indicate that small dredge operations can be managed to avoid significant impacts to fish habitat. In a study of suction dredging in a California stream, Harvey (1986) found that rainbow trout were apparently unaffected by small suction dredges unless a major change in habitat occurs. Harvey attributed the apparent lack of effects on trout to a lack of desirable pools and water depth in the area; therefore, habitat alterations had little effect. The section of Lolo Creek proposed for dredging provides marginal spawning and rearing habitat due to low stream gradient and high summer water temperatures.

The proposed action for Lolo Creek includes numerous restrictions to ensure that major habitat changes do not occur, including avoiding likely steelhead spawning areas and avoiding mining around key habitat channel features such as boulders and logs. The primary mitigating factors in the proposed action are delaying activities until steelhead adults have completed their spawning activities and the majority of steelhead alevins have emerged from their redds as free-swimming fry, in addition to a number of operating procedures that limit habitat alterations. While these measures reduce the likelihood and severity of adverse effects, they do not eliminate potential for

redd and juvenile steelhead trampling, increased turbidity, fish harassment and displacement, or introduction of toxins; all of which could harm or kill steelhead.

The NPT has released approximately 50,000 steelhead smolts into Lolo Creek each spring since 2003. The NPT estimates the vast majority of these fish leave Lolo Creek by mid-June (S. Sprague, NPT, pers. comm.). Therefore, the hatchery outplants should not be affected by suction dredging that would begin on July 15.

Effects of dredging and trampling. The precise timing of steelhead spawning and emergence of juveniles from redds varies among locations and years and is not known for Lolo Creek; consequently, the timing is estimated from limited counts of adult returns to Fish Creek (the drainage adjacent to Lolo Creek headwaters) and two observations of adult returns to Lolo Creek. Fish Creek has a higher mean elevation than Lolo Creek, and water temperatures are cooler than Lolo Creek, but it is the best information available on steelhead in the Clearwater Basin and provides a reasonable indicator of spawning and emergence dates. At the Fish Creek weir, the earliest returns in 2005 and 2006 were on March 20 and March 29, respectively, and the latest returns were observed on June 1 and June 4, in the same years (Byrne 2006; Byrne and Copeland 2007). Ninety percent of the adult female steelhead in Fish Creek passed the weir by May 13 in 2005, and May 24 in 2006. Spawning occurs soon after fish reach the spawning sites. The latest date for spawning was estimated by adding 1 week to the latest date that fish returned to the stream. Due to the variation and uncertainty in the timing, the latest spawning date and coldest temperatures are used to estimate the latest date that fry would emerge from redds in Lolo Creek (Appendix A). The analysis in Appendix A suggests that the proposed dredging is likely to begin after the majority of steelhead have emerged from the gravels in years with warm or moderate temperatures, but some alevins may still be in redds at the beginning of the dredge mining season if the spring is unseasonably cold.

Stepping on redds or excavating a redd could directly kill eggs and alevins if dredging were to occur in areas where redds are located. Trampling effects are most severe during the latter stages of alevin incubation when they are closest to the gravel surface. Miners can only work in designated work zones where conditions are unsuitable for redd construction. Designating work zones eliminates trampling or excavating redds, unless a redd is located in an area not recognized by biologists as a potential spawning site, or if a miner walks or operates outside their designated work zone. In two previous Lolo Creek dredging seasons (1998 and 2001), post-season monitoring found only one occasion where an operator excavated a small gravel bar in a work zone that was marginally suitable for steelhead spawning.

Nearly all steelhead redds found within the action area are associated with log drop structures or side channels artificially created by the NPCNF. Knowing where these habitat features are located makes it easier for the NPCNF and miners to identify likely redd locations and to avoid them. The NPCNF minimization measures prohibit dredging near any log drop structure.

It is unlikely that a redd will be damaged or destroyed by mining activities. During normal years when water temperatures are not unusually cold, steelhead will have already emerged from redds

by July 15. Also, monitoring data from two previous mining seasons indicates that the standard operating procedures established by the NPCNF will keep miners away from potential steelhead spawning locations.

Some juveniles hiding in the streambed may be crushed by miners trampling, moving large rocks, dragging heavy equipment, and backfilling dredge holes, but this should be limited because small amounts of substrate are moved at fairly slow rates and most fish are able to avoid entrapment. The action also has the potential to harm, harass, or kill juvenile fish by sucking fish through dredges or against screens. However, this risk is exceedingly low because small dredging activities move slowly and juvenile mobility is increased due to higher summer water temperatures and the larger size of juvenile fish at this time of year. Most fish will swim away from disturbances rather than shelter for extended periods. Finally, the estimated number of juvenile fish in the maximum area proposed to be dredged is low, ranging from 20 to 140 (0.3 – 2.1 fish/100 m^2 and this will greatly minimize the exposure of fish to harm or death from these pathways.

Effects of turbidity. Once steelhead have emerged from redds, small, newly-emerged fry have limited ability to move away from a dredge to avoid turbidity. Turbidity can cause adverse effects, ranging from displacement to other behavioral effects causing injury or death, depending on the length of exposure (Newcombe 1991). However, typical behavior of fry limits the likelihood that this would occur, and only sublethal effects are expected. These sublethal effects may include juvenile salmonid avoidance of turbid waters (Scannell 1988), or chronic exposure that can cause physiological stress responses, increasing maintenance energy and reducing feeding and growth (Lloyd 1987). Although the sublethal effects could occur, the precautionary measures and constraints on the mining activities are expected to moderate the effects due to the short time duration, low intensity of the activity, and the ability of juvenile fish to move and avoid exposure.

During the first few months after emergence, fry establish territories in shallow, low velocity areas that are typically located at the edge of the stream. The precautionary measures in the proposed action preclude operating a dredge in suitable spawning areas and the shallow stream margins that fry and fingerling prefer. Other protective measures include prohibitions for undercutting the bank, limitations on discharging fine sediment, and operating the dredge in a manner that intake or outfall are directed toward the bank.

When fish have grown beyond the fry stage, their ability to avoid turbidity greatly increases. Juvenile steelhead generally acquire the ability to swim against water current several weeks after emergence, and swimming skills continue to improve as fish grow. Turbidity plumes observed during past NPCNF monitoring often have not been visible more than 25 feet downstream from the dredges. However, longer plumes have been observed and the proposed action prohibits dredging if visible turbidity extends more than 150 feet downstream. The effects of turbidity are expected to be minor to juvenile fish since it would be short lived (several hours at a time) and localized (never more than 150 feet at each site). The limited size and duration of turbidity plumes provides opportunity for juvenile fish to avoid the plume by moving to one of many

adjacent areas unaffected by turbidity, particularly since the total maximum dredge area is expected to be 1.6 acres or less within an action area that is 9.5 miles long and encompasses about 55 acres of stream.

Effects of disturbance. Steelhead may become stressed by engine noise and miners working in the water, climbing, transporting, and refueling heavy equipment along streambanks, and their extended camping and accessing of riparian areas. These disturbances could lead to interruptions and alterations in normal behavioral patterns. If daytime feeding is diminished due to mining activities, it could reduce the growth rate and harm fish in a variety of ways. Smaller fish experience high rates of winter mortality (Biro *et al.* 2003), under-sized smolts have lower rates of survival to the adult stage in comparison to larger fish (Beamish and Mahnken 2001; Sogard 1997; Mebane and Arthaud 2010), and slow-growing salmonids may require an additional year or more of residence time to reach the minimum size before out-migrating as smolts (Zabel and Williams 2002). Although noise and movement activities could potentially have negative effects on feeding behavior, past observations made by miners, the NPCNF, and NMFS during field reviews showed fish feeding within a few feet of the activity and often in the turbidity plume itself. Others have made similar observations, Hassler *et al.* (1986) noted juvenile steelhead shifted to feed on invertebrates that had been dislodged or expelled by the dredge. Although the long-term effects of small scale dredging on invertebrate populations are generally not known and fish are likely to alter their feeding behavior during mining, the overall effect on growth is expected to be small and possibly beneficial in some short-term cases. Because the proposed dredging is restricted to daytime hours, peak twilight feeding periods will not be disrupted. Normal feeding activity and key food sources along streambanks and under riparian vegetation are protected because the proposed action prohibits mining of streambanks and limits potential damage during camping and access.

Movements of juvenile steelhead past the dredge operations will be delayed during daylight hours until instream activities cease, particularly if multiple dredges are operating nearby at the same time. However, delays of this nature are unlikely to have any appreciable effect on growth or survival. Young salmonids occasionally move to new territories due to factors such as different habitat requirements as fish increase in size; changes in food availability or flow at a particular site; or in response to other fish (Skoglund and Barlaup 2006, Schrank and Rahel 2006). Juvenile salmonids typically do not move to new territories on a daily basis, but tend to move on a scale of weeks to months, rather than days. Most miners operate over a 10-hour period with several breaks during the day, allowing for reasonable fish movement on most days.

Effects of toxins. Due to the close proximity of work activities to the stream, accidental releases of small amounts of fuel and oil from suction dredges may occur. Petroleum-based contaminants contain poly-cyclic aromatic hydrocarbons, which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic sublethal effects to aquatic organisms at lower levels (Neff 1985). The NPCNF's minimization measures require: (1) Inspecting equipment to fix leaks; (2) anchoring dredges to the streambank so fuel is not carried out into the stream; (3) refueling with no more than 1 gallon at a time; and (4) providing a spill kit in case of accidental spills. Therefore, NMFS expects that any potential spillage would be insignificant to

steelhead due to the minimization measures and the small amount of potential spill in relation to the stream volume.

Summary of Effects on VSP parameters. It is unlikely that the proposed action will adversely affect the viability of the Snake River Steelhead DPS or the Lolo Creek population. This determination is based on the following reasons: (1) The estimated number of juvenile fish in the maximum area proposed to be dredged is low, ranging from 20 to 140 (0.3 – 2.1 fish/100 m^2) and few, if any, are expected to be killed; (2) the number of fish that might be injured or temporarily displaced is small in relation to the number of juveniles in the Lolo Creek population; (3) it is not likely that a redd would be disturbed because of the identification and exclusion of potential spawning sites; and (4) the approximately 50,000 steelhead smolts stocked annually by the NPT in Lolo Creek will not be affected because they will migrate past or out of the action area before dredging is authorized to start.

2.4.2. Effects on Critical Habitat

Critical habitat within the action area has an associated combination of physical and biological features essential for supporting spawning, rearing, and migration of the Lolo Creek steelhead population. The critical habitat elements most likely to be affected by the proposed action include water quality (chemical/turbidity), substrate/spawning gravel (sediment related), forage, cover/shelter, water velocity, and pool frequency.

The primary conservation measures of the proposed action are to avoid effects to spawning habitat by identifying and excluding potential spawning areas and to minimize effects on rearing habitat through numerous constraints that limit habitat alterations. The NPCNF's BA provides an analysis of the effects of the proposed action on Snake River steelhead and their habitat through the use of the matrix of pathways and indicators, and procedures in NMFS (1996). This analysis reviews the matrix and other information in the BA, VSP data, and the best scientific and commercial data available to evaluate elements of the proposed action that have the potential to affect the listed fish or their habitat.

In general, the amount of habitat alteration caused by suction dredging depends on how the dredges are operated. Harvey and Lisle (1998) reviewed dredging literature and concluded that the effects of habitat alteration could be minor, localized, and brief, or may go as far as to harm population viability, depending on each particular stream system. Because dredging effects vary depending on the channel environment and dredging procedures, they recommended that managers carefully analyze the watershed where mining is proposed and tailor mining regulations to the particular issues and effects in the watershed. Consequently, the proposed dredge mining in Lolo Creek is managed on a site-specific basis to ensure that habitat alterations are limited to minor changes.

Effects on substrate, natural cover, and spawning habitat. Excavating holes, piling dredged gravels, and redistributing large rocks and woody debris can result in localized changes in stream

substrate, natural cover, and spawning habitat. As discussed in the effects on listed species for dredging and turbidity, these types of habitat alterations are minimized by the precautionary measures in the proposed action.

Harvey and Lisle (1998) stated that examination of dredging impacts should include related activities such as camping. Dredge miners often camp in riparian areas, and sites are often utilized for extended time periods with the resulting potential for waste disposal problems, loss of riparian vegetation, and other site damage. Based on observations from past years, the NPCNF has noted some disturbances to vegetation, but they appear to be minor and localized. Risks of these impacts are greatly reduced through NPCNF site monitoring, bank repair, and vegetation replanting stipulations now included as permit conditions.

Minor instream habitat alterations that may exist at the end of the mining season are unlikely to still exist by the time steelhead spawn in the spring. Somer and Hassler (1992) monitored dredge sites and found that high flows redistributed bedload, filled dredge holes, and flushed sediment from the dredge sites. Spawning habitat alterations are further reduced by requiring miners to avoid operating in natural spawning areas such as gravel bars at pool tailouts and artificial spawning areas near log drop structures and side channels. Miners are also required to fill in dredge holes and disperse dredge tailings. Following previous dredge operations in Lolo Creek, mined areas could not be visibly distinguished from unmined areas following several high flow events. Because of the protective measures in the proposed action and the natural stream dynamics, dredging-related spawning habitat alterations will be minor and will only affect the streambed for a short time. It is unlikely that steelhead will encounter unstable gravel deposits created by dredging.

Nearly all steelhead redds found within the action area are associated with log drop structures or side channels artificially created by the NPCNF. Knowing where these habitat features are located makes it easier for the NPCNF and miners to identify likely redd locations and to avoid them. The NPCNF minimization measures prohibit dredging near any log drop structure.

Effects on water quality. Turbidity and suspended sediment are generated by suction dredge operations, but small dredges typically do not create long plumes of turbidity. Suction dredges operate primarily in areas with cobble substrate or bedrock seams, where heavier particles and ore-bearing deposits are typically found. These particles tend to settle rapidly, which limits sediment plumes to short distances from the sluice outlet. In a similar dredge-mined stream, Thomas (1985) found that suspended sediment concentration returned to background levels 35 feet downstream from the dredge. The Idaho Department of Environmental Quality (IDEQ) measured turbidity downstream of same-sized dredging operations in a similar stream channel, and found that even when measured immediately behind the sluice outlet, turbidity did not exceed the state acute standard of 50 nephelometric turbidity units (D. Stewart, IDEQ, pers. comm.). The NPCNF monitoring of past Lolo Creek dredge operations showed turbidity has often been undetectable beyond 25 feet downstream of suction dredges due to the low stream gradient (average 1%) and low summer flows. However, plumes of up to 150 feet have been observed and, as a result, the NPCNF has inserted a permit condition which requires miners to cease operations if sediment plumes reach this length. Under these circumstances, the downstream effects of suspended sediment on water quality are likely to be small because of the low level of turbidity and the short travel distance downstream.

Effects on forage availability. Because suction dredging could cause physical channel alterations, it could potentially affect juvenile steelhead food availability. One year after dredging, Harvey *et al.* (1982) reported virtually no evidence that dredging had occurred at one study site and substrate changes were not detectable at the other site. In a northern California stream, Somer and Hassler (1992) monitored density and composition of benthic invertebrates and physical stream characteristics above and below dredge sites. They found qualitative differences in invertebrate species above and below the dredging, but no significant differences in numbers of invertebrates or diversity indices. Given the dispersed and relatively small area of the stream bottom affected by dredging and that most juvenile steelhead forage is related to water column drift, it is unlikely that the amount or availability of steelhead forage will change as a result of dredging.

Effects on connectivity. Mining related tailings and stream grade alterations could alter the ability of juvenile fish to move throughout the stream to seek more suitable food sites and to avoid predation. However, the minimization measures in the proposed action require that shallow areas be restored to their original grade at the end of each day, natural pools may not be filled, and tailings must be redistributed before moving to the next dredge site and at the end of each season. Therefore, habitat connectivity within the stream channel will be disrupted daily, but will be partially restored each evening and almost completely restored at the end of the mining season, resulting in minimal, short-term disturbances to instream habitat connectivity.

Summary of effects on critical habitat. The proposed action will have minor negative effects on critical habitat in Lolo Creek. This is because: (1) The cumulative maximum area of habitat being dredged is small, 1.6 acres or less within an action area that is 9.5 miles long encompassing about 55 acres of stream; (2) suction dredging will occur in a reach of stream that does not

generally provide suitable spawning habitat for steelhead; and (3) the suite of minimization measures in the proposed action will greatly reduce impacts to steelhead habitat.

2.5. Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Cumulative effects that reduce the ability of an ESA-listed species to meet its biological requirements may increase the likelihood that the action will result in jeopardy to that ESA-listed species or in destruction or adverse modification of a designated critical habitat.

The action area for the proposed action is entirely contained within federal lands. For this reason, NMFS is not aware of any state or private actions that are reasonably certain to occur or have effects in the action area.

2.6. Integration and Synthesis

The Integration and Synthesis section is the final step of NMFS' assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) Result in appreciable reductions in the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2).

The proposed action involves riparian and instream activities that are potentially harmful to steelhead and their habitat. NMFS expects, however, that the precautionary measures in the proposed action will be effective in avoiding or minimizing adverse effects to steelhead and designated critical habitat. Key measures to protect steelhead or critical habitat include the July 15 to August 15 work window; pre-season surveys of all project sites for potential locations of steelhead redds and exclusion of mining from those areas; fuel containment and storage controls; inspections of equipment for leaks; rules prohibiting alteration of key habitat elements such as logs, boulders, and streambanks; NPCNF oversight of critical portions of project implementation (including camping and access) and mitigation; monitoring; and reporting.

Although possible that dredge operations might disturb redds, the risk of direct mortality from crushing or burial is low based on NPCNF review of 2 previous years of operation. Key factors in reducing mortality are delaying dredging until all or nearly all fish have emerged from redds

and locating dredge operations where they are unlikely to disturb spawning gravels. The proposed action is not likely to harm or kill adults, because they should not be present during the July 15 through August 15 time frame. Crushing juveniles hiding in the streambed or when backfilling dredge holes will likely occur, but should be limited because small amounts of substrate are moved at fairly slow rates and most fish are able to avoid entrapment. There are also very low densities of fish present in the project area which will further reduce the risk of killing fish.

Disruption of juvenile steelhead feeding behavior is likely, but the harm caused is not expected to greatly diminish the growth of individual steelhead because the daily hours of dredge operation will not interfere with early morning and early evening feeding, dredging dislodges invertebrates from gravels and increases the short-term availability of food even though it could reduce long-term production, and juvenile fish only move short distances to resume feeding.

Juvenile movements through the action area will be temporarily disrupted while dredges are operating, but fish can move short distances and adequately find space between mining operations. Dredge operations are limited to daylight hours, with no more than one mining operation in each 50-foot stream section, and operations must be located at least 150 feet apart. Fish movement will not be disrupted during those times when dredges are not operating and miners are not in the stream.

It is unlikely that the proposed action will adversely affect the viability of the Snake River Steelhead DPS or the Lolo Creek population. This determination is based on the following reasons: (1) The estimated number of juvenile fish in the maximum area proposed to be dredged is low, ranging from 20 to 140 (0.3 – 2.1 fish/100 m^2) and few, if any, are expected to be killed; (2) the number of fish that might be injured or temporarily displaced is small in relation to the number of juveniles in the Lolo Creek population; (3) it is not likely that a redd would be disturbed because of the identification and exclusion of potential spawning sites; and (4) the approximately 50,000 steelhead smolts stocked annually by the NPT in Lolo Creek will not be affected because they will migrate past or out of the action area before dredging is authorized to start.

Digging and refilling holes by dredging sorts and rearranges gravels, but is not likely to alter physical channel features of critical habitat in the action area to the extent that the use or suitability of the dredged areas for rearing is appreciably altered. Monitoring of previous mining activity in Lolo Creek indicates that dredged areas may not be discernible the following year due to rejuvenation by natural processes. There should be no appreciable change in the amount and quality of rearing habitat in the action area due to required safeguards that prohibit disturbing streambanks, large logs, and boulders, which are key structural components of rearing habitat and forage production.

The action area is a reach of stream that is 9.49 miles long and 55 acres, yet the cumulative maximum area of Lolo Creek that may be mined under this program is relatively small (1.6 acres or less), leaving the majority of the action area unaffected by the dredge operations. The PCE for

spawning is virtually unchanged by the action because areas where dredges will be allowed to operate are considered by NPCNF biologists to be unsuitable for steelhead spawning due to large substrate, low stream gradient, and high summer temperatures. Also, the proposed action includes precautionary measures that avoid creating unstable spawning areas, delaying mining activities until steelhead are likely to have emerged from redds, and flagging areas where miners can dredge without disrupting potential spawning gravels. The PCE for adult and smolt migration is not affected because there is little physical alteration of the stream channel that would affect migration, and steelhead do not migrate through the action area at the time of year that dredging will occur. Physical stream alterations will have only minor effects on the ability of juvenile steelhead to move within the action area because it will not create physical impediments to fish movement. Therefore, the effects to critical habitat are expected to be very minor in their nature and geographic extent.

Because the effects will not be substantial enough to negatively influence VSP criteria at the population scale, the viability of the MPGs and evolutionarily significant units/DPS are also not expected to be reduced. Considering the baseline condition of the critical habitat, the proposed action is not expected to appreciably diminish the conservation value of the PCEs at a watershed scale.

2.7. Conclusion

For the reasons described above, the effects of the proposed action are not expected to reduce the abundance, productivity, spatial structure, or genetic diversity of the Lolo Creek population of SRB steelhead. Also, the effects of the proposed action are not expected to reduce the function of the PCEs or the conservation value of designated critical habitat in the Lolo Creek watershed. Therefore, after reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of SRB steelhead or destroy or adversely modify their designated critical habitat.

2.8. Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. For purposes of this consultation, we interpret "harass" to mean an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point

where such behaviors are abandoned or significantly altered.[3] Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, if that action is performed in compliance with the terms and conditions of this ITS.

2.8.1. Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of the ESA-listed species. NMFS is reasonably certain the incidental take described here will occur, because SRB steelhead are known to occur in and migrate through the action area, and the proposed action may cause harm by crushing juvenile steelhead rearing or hiding in substrates through temporary displacement of fish and disruption of normal behavior such as feeding. Due to the proposed project timing, only juvenile steelhead should be present and affected in this manner. Sediment plumes from mining operations are expected to persist through daylight hours with low intensity and limited downstream extent, which might reduce feeding efforts by any fish present or force them to seek other available nearby cover. Petroleum chemical contamination from spills or leaking mining equipment may displace fish through avoidance. The access and moving of miners, mining equipment, ore, redistribution of till, and other disturbances will likely result in crushing of subyearling steelhead rearing in substrate, under banks, or in cobble substrates.

The proposed project will minimize or avoid the majority of negative effects of the project to fish. However, take of steelhead will occur, despite the conservation and mitigation measures, in the form of harassment during activities and potential mortality from crushing individuals in the substrate. Dredging will generate turbidity pulses and plumes that will temporarily displace fish and reduce feeding, and noise of gasoline engines could disturb and temporarily displace juvenile salmon and steelhead. Because miners will not be allowed to dredge in areas suitable for redds, and because the sections of stream designated for mining are not suitable habitat for redds, no take of redds or alevins is expected, and none is authorized.

NMFS is reasonably certain that the incidental take described here will occur because: (1) Juvenile steelhead are known to occur in the action area during the proposed in-water activity; (2) the proposed action is likely to cause impacts that could result in mortality or impair feeding, rearing, and migration; and (3) the proposed action is likely to temporarily displace an ESA-listed species from preferred habitat during dredge mining activities.

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3 NMFS has not adopted a regulatory definition of harassment under the ESA. The World English Dictionary defines harass as "to trouble, torment, or confuse by continual persistent attacks, questions, etc." The U.S. Fish and Wildlife Service defines "harass" in its regulations as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). The interpretation we adopt in this consultation is consistent with our understanding of the dictionary definition of harass and is consistent with the U.S. Fish and Wildlife interpretation of the term.

Monitoring or measuring the number of steelhead actually harmed or killed during project activities is not feasible. The harm associated with harassment and displacement is likely to be sublethal and undetectable; therefore, the number of affected fish is difficult to quantify. The take associated with the excavation, fill, and other movements of substrate is likely to be lethal, though discerning the precise number of juveniles crushed is not possible without knowing the precise number of juveniles hiding in the substrate in the locations where dredging is likely to occur, which is not possible. Because the number of fish affected by crushing relates directly to the area of stream affected by excavation and fill, an increase in the area in which mining occurs will result in more fish being taken than considered in this opinion. The harm associated with harassment and displacement is most closely related to the area disturbed by mining activities. This is primarily the area in which excavation and fill takes place, but also includes the area where fish may be disturbed by miners walking and moving equipment, and the turbidity plume produced by mining activities. The area in which walking and equipment movement takes place is difficult to quantify, but is likely not significantly larger than the area in which excavation and fill takes place. As discussed in the effects section, the area affected by turbidity is generally expected not to exceed 150 feet downstream. The best measure of the extent of take is therefore the combined area in which dredging and filling takes place and in which a turbidity plume is likely to occur.

The extent of take allowed in the Opinion is exceeded if:

1. The amount of habitat disturbance from mining exceeds 36,000 ft^2 in any single season or the cumulative amount among seasons exceeds 72,000 ft^2.

2. Turbidity is observed 150 feet downstream of any active mining site at any time.

The authorized take includes only take caused by the proposed actions within the action area as defined in this Opinion. The extent of take is the threshold for reinitiating consultation. Should this limit be exceeded, the reinitiation provisions of the Opinion apply.

2.8.2. Reasonable and Prudent Measures and Terms and Conditions

"Reasonable and prudent measures" are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02). "Terms and conditions" implement the reasonable and prudent measures (50 CFR 402.14). These must be carried out for the exemption in section 7(o)(2) to apply.

The NPCNF shall comply with the following RPMs:

1. The NPCNF must actively plan all project related activities and ensure that operations are conducted accordingly.

2. The NPCNF shall provide monitoring sufficient to ensure that project activities are conducted as described in the proposed action and that the extent of take described above is not exceeded.

2.8.2.1. Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the NPCNF and its cooperators, including the applicant, if any, must fully comply with conservation measures described as part of the proposed action and following terms and conditions that implement the RPMs described above. Partial compliance with these terms and conditions may invalidate this take exemption, result in more take than anticipated, and lead NMFS to different conclusion regarding whether the proposed action will result in jeopardy or the destruction or adverse modification of designated critical habitats.

NMFS believes that the following terms and conditions are necessary and appropriate to avoid or minimize take of Snake River steelhead resulting from implementation of the action.

1. To implement RPM 1 (planning and operations), the NPCNF shall:

   a. Obtain a plan of operation from the suction dredge miners before dredge mining begins. The plan must specify the location, approximate amount of surface area to be dredged, and the projected dates of operation. The operating plan will be used to establish channel monitoring sites to ensure that all dredge operations avoid likely steelhead spawning areas.

   b. Require miners to immediately cease operations if: (1) Eggs are excavated or if dead or injured steelhead are observed; (2) the NPCNF or the NPT observes that miners are not following their plan of operations; or (3) if any of the criteria for the extent of take in Section 2.2.1 of this Opinion are exceeded. The NPCNF shall contact NMFS immediately if this occurs.

   c. Require all terms and conditions be included in any permit, grant, or contract issued for the implementation of the action described in this Opinion.

   d. Establish upstream and downstream work zone boundaries by marking areas allowable for dredge mining. Allowable work zones are those locations where redds are unlikely to occur and where dredging will not result in long-term alteration of channel morphology or streamflow.

e. Limit all instream mining activities to the designated work zones. If an operator exceeds the limits of their designated work zone, the NPCNF shall notify NMFS within 24 hours of the observed violation to determine if reinitiation of consultation is required.

f. Ensure that campers use established developed or undeveloped campgrounds, and that new roads or camping areas are not created in riparian areas or that riparian habitats are not damaged.

2. To implement RPM 2 (monitoring), the NPCNF shall:

a. Provide NMFS with an annual monitoring report describing operator compliance with suction dredging rules, the amount of stream area mined at each site, pre and post-dredging photos of the entire mined area, and details about any streambank vegetation disturbance and revegetation. Submit the annual monitoring report by November 30 each year to: NMFS, 10095 W. Emerald, ,Boise, Idaho, 83704.

b. During field reviews that are part of the proposed action, monitor to ensure that the extent of take described above (size of area in which mining occurs and size of turbidity plumes) is not exceeded.

c. If a steelhead becomes sick, injured or killed as a result of project-related activities, and if the fish would not benefit from rescue, the finder should leave the fish alone, make note of any circumstances likely causing the death or injury, location and number of fish involved, and take photographs, if possible. If the fish in question appears capable of recovering if rescued, photograph the fish (if possible), transport the fish to a suitable location, and record the information described above. Adult fish should generally not be disturbed unless circumstances arise where an adult fish is obviously injured or killed by proposed activities, or some unnatural cause. The finder must contact the Boise Field Office of NMFS Law Enforcement at (208) 321-2956 as soon as possible. The finder may be asked to carry out instructions provided by Law Enforcement to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

2.9. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).
The following recommendations are discretionary measures that NMFS believes are consistent with this obligation and therefore should be carried out by the NPCNF:

- To mitigate the effects of climate change on ESA-listed salmonids, follow recommendations by the ISAB (2007) to plan now for future climate conditions by implementing protective tributary. In particular, implement measures to protect or restore riparian buffers, wetlands, and floodplains; remove stream barriers; and ensure late summer and fall tributary streamflows.

- Seek opportunities to protect undeveloped areas or restore developed areas of Lolo Creek, its tributaries, and floodplain into the future.

- Complete a compensatory mitigation plan to offset logging, grazing, and mining impacts on NPCNF lands and waters.

- Monitor stream temperatures for Lolo Creek between April 1 and June 30 of each year to predict steelhead alevin emergence times from redds and adjust any future dredging season proposals according those predicted emergence times.

Please notify NMFS if the NPCNF carries out these recommendations so that we will be kept informed of actions that minimize or avoid adverse effects and those that benefit ESA-listed species or their designated critical habitats.

2.10. Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

To reinitiate consultation, the NPCNF should contact the NMFS Idaho State Habitat Office in Boise, Idaho, and refer to the NMFS number assigned to this consultation.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) designated EFH for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction of this document. The action area includes areas designated as EFH for freshwater life-history stages of Chinook salmon and coho salmon. Coho juveniles are released into portions of the Lolo Creek action area after dredging operations are completed. These juvenile fish will out migrate as smolts the following spring. We therefore believe the proposed action will not affect coho salmon.

Based on information provided in the BA and the analysis of effects presented in the ESA portion of this document, NMFS concludes that the proposed action could result in unstable hydrologic gravels being deposited along the stream bottom. These clean gravels could be attractive to spawning Chinook salmon for redd sites. Redds located in unstable gravels are expected to have lower than normal egg to fry survival.

3.1. EFH Conservation Recommendations

NMFS believes that the following conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH. These conservation recommendations are non-identical to those identified as ESA terms and conditions.

1. The NPCNF should observe whether Chinook salmon use dredging sites to construct redds. If redds are constructed in dredged gravels, determine if these gravels persisted to the following spring. The NPCNF should report these findings to NMFS by June of the year following project activities.

2. The NPCNF should inspect Chinook salmon spawning areas before dredging operations begin and throughout the mining season and discontinue operations 50 feet or less above any discovered Chinook redd. The NPCNF may relocate dredge operations to an alternative suitable location to avoid a spawning area.

3.2. Statutory Response Requirement

Federal agencies are required to provide a written response to NMFS' EFH conservation recommendations within 30 days of receipt of the recommendations [50 CFR 600.920(j)(1)]. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse effects of the activity on EFH. If the response is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations. The reasons must include the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

3.3. Supplemental Consultation

The NPCNF must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920(l)).

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act [DQA]) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these DQA components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users.

This ESA consultation concludes that the proposed small-scale suction dredging action in Lolo Creek will not jeopardize the Snake River Basin steelhead. Therefore, the NPCNF can authorize this action in accordance with its authority under the Federal Land Policy and Management Act of 1976 and The Forest Service Surface use Regulations. The intended users are 18 permittees.

Individual copies of this document were provided to the entities listed in the transmittal letter. This consultation will be posted on NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

4.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in

Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3. Objectivity

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including NMFS ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01, *et seq.,* and the MSA implementing regulations regarding EFH, 50 CFR 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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APPENDIX A

Predicting Lolo Creek Emergence Times of Steelhead Alevins from Redds

To determine probable spawning times of Lolo Creek steelhead, NMFS gathered as much site observation data as available on Lolo Creek steelhead, other known observations on naturally spawning Snake River Basin steelhead, hatchery steelhead/rainbow trout development data, flow data from Lolo Creek, and temperature data from Lolo Creek. By combining these sources of information, the conclusion is that Lolo Creek steelhead will spawn over a wide range of time and temperatures within a given year. Steelhead may tend to spawn just before, during, and after spring high flow events. In Lolo Creek, highest flows typically occur between mid-April and mid-May in most years. Steelhead eggs are known to mature very slowly at temperatures below 7.2°C. Based on two observations of spawning steelhead (May 5, 2003 and June, 1960 [no day provided]), it seems probable that Lolo Creek steelhead typically spawn between mid-April and June 1. During the typical spring temperature years of 2001, 2003, and 2005, the optimal egg development temperature of 7.2°C occurred on May 12, May 22, and May 23. This is within the range of assumed spawning time for Lolo Creek steelhead.

The amount of Centigrade temperature units (CTUs) needed by steelhead to hatch and emerge from redds varies considerably at different water temperatures. Table A-1 below derived from Leitritz and Lewis (1976) illustrates this. A CTU equals the sum of mean daily temperatures above 0°C.

Table A-1. Number of days and CTUs required for steelhead eggs to hatch

Water °C.	Days to Hatch	CTUs Required
4.4	88	356
7.2	48	346
10	31	310
12.8	24	306
15.6	19	296

As this table illustrates, not only does the days to hatch decrease dramatically with increasing temperature of 7.2°C and above, but the number of required CTUs also drops. The combination of these two has the effect of bringing the hatching time of eggs spawned over a 3 to 4 week period of cold temperature in the spring very close together.

NMFS used data on CTUs for first emergence from gravel of rainbow trout at an average water temperature of 7.5°C (84 days and 632 CTUs) (Roberts 1988), and data on CTUs for first emergence from a naturally spawned redd in Gumboot Creek, Imnaha River (Stack and Bronec 1998) with an average water temperature of 10.8°C (41 days and 442 CTUs). Using these CTUs as representative of emergence times based on their water temperatures, NMFS interpolated first emergence dates using Lolo Creek average water temperature data for the years 1992, 1993, 2001, 2002, 2003, and 2005. May 10 and June 1 were the assumed spawning dates for this analysis. The results are shown in Table A-2.

Table A-2. Estimated Fry Emergence Dates

Year	Spawned May 10 Start Emerge	Spawned June 1 Start Emerge	Spawned May 10 80 % Emerge	Spawned June 1 80% Emerge
1992*	6/11*	6/20-6/21	6/21	6/30
1993	7/9	7/13	7/19	7/21
2001	7/5-7/6	7/7-7/8	7/15	7/17
2002	7/16	7/16	7/26	7/26
2003	7/4-7/5	7/5-7/6	7/14	7/15
2005	7/1-7/2	7/5	7/11	7/15

(*The start date for 1992 was May 19 because no temperature data were available before that date.)

Thurow (1987) showed that 98% of steelhead alevins emerge within 14 days on the South Fork Salmon River. This data indicates that typically about 80% emergence occurs within 7 days. The data also shows that (based on five redds each of 2 years) alevins from different redds began emerging within 3 days of each other. Within 10 days of the first emergence, 80% of alevins had emerged as fry in all five redds. This was consistent in 1984 (considered a cold year) and 1985 (considered a typical year). Apparently, at the time of emergence in both years, the South Fork Salmon River was close to the same temperature. Table A-2 illustrates this additive factor as 80% emerge. Based on these dates, the following range of emergence times for Lolo Creek steelhead fry can be assumed. In very warm springs (1992), steelhead will start emerging in early June and finish by about June 15. In very cold springs (1993 and 2002), steelhead will start emerging between July 9 and 16 and finish about July 26. In what are considered typical spring water temperature years (2001, 2003, and 2005), Lolo Creek steelhead will start emerging between July 1 and 6 and finish emerging by July 17.

These data findings are consistent with the 2-year study of Thurow (1987) for steelhead incubating in Poverty Flat of the South Fork Salmon River. In Thurow (1987), a cold year, steelhead began emerging on July 13 and completed 80% emergence by July 23. The consistency in the start date of steelhead emergence from five different redds each year is significant because these redds were randomly selected and could have been created over a wide period of time. These data are also consistent with NMFS' approximation of emergence dates based on knowing average stream CTUs and then interpolating between known emergence dates from gravel redds. These results indicate that redds created weeks apart in water having a consistent warming trend will tend to hatch within a narrow time range.

APPENDIX B

Summary of Effects on Fish, Periphyton, and Invertebrates Noted for Turbidity Ranges

Nephelometric Turbidity Units (NTU) and Jackson turbidity units (JTU) are roughly equivalent. This table and the references for these effects are found in Rowe *et al.* (2003).

Effect	Organism	Turbidity range	Reference
Increased blood sugar levels	Juvenile coho	Linear correlation	Sevizi and Martens 1992
Increased coughing	Juvenile coho	3-30 NTU for 24 hours	Sevizi and Martens 1992
Altered behavior	Juvenile coho	10-60 NTU	Berg 1982; Berg and Northcote 1985
	Largemouth bass and green sunfish	14-16 JTU	Heimstra *et al.* 1969
	Steelhead and coho	11-51 NTU	Sigler *et al.* 1984
Emigration/avoidance	Juvenile coho and steelhead	22-265 NTU	Sigler 1980
	Juvenile coho	>37 NTU	Sevizi and Martens 1992
	Juvenile coho	10-60 NTU	Berg 1982; Berg and Northcote 1985
Reduced feeding rate	Brown trout	7.5 NTU	Bachman 1984
	Lahontan cutthroat trout and Lahontan redside shiner	3.5-25 NTU	Vinyard and Yuan 1996
Reduced reaction distance	Lake trout, rainbow trout, cutthroat trout	3.2 – 7.4 NTU	Vogel and Beauchamp 1999
	Brook trout	0 – 43 NTU	Sweka and Hartman 2001
Reduced growth	Juvenile coho and steelhead	22-113 NTU	Sigler 1980
	Juvenile coho and steelhead	as low as 25 NTU	Sigler *et al.* 1984
Reduced survival	Juvenile coho	15 – 27 JTU	Smith and Sykora 1976
Reduced primary production	Algae/periphyton	3 – 25 NTU	Lloyd *et al.* 1987
Reduced density	Benthic invertebrates	8.4 – 161 NTU	Quinn *et al.* 1992
Reduced feeding rate, food assimilation, and reproductive potential	*Daphnia pulex*	10 NTU	McCabe and O'Brien 1983